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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/372,331	08/11/1999	NIKOLAI NEFEDOV	297-008769-U	1278

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CLARENCE A GREEN
PERMAN & GREEN
425 POST ROAD
FAIRFIELD, CT 06430

EXAMINER

CHANG, EDITH M

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 05/19/2004

23

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/372,331

Applicant(s)

NEFEDOV, NIKOLAI

Examiner

Edith M Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10 and 12-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 22.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The first reference, "Combined Multiuser Reception and Channel Decoding for TDMA Cellular Systems", listed in the IDS filed on April 29 2004 of Other Documents section is crossed out. Since it was listed in the PTO-892 of paper 6 to avoid the duplication.

Response to Arguments

2. Applicant's arguments filed March 4 2004 have been fully considered but they are not persuasive.

Argument: Page 7 lines 14-17, it is thus very natural that Kibayashi does not contain any motivation for the person skilled in the art to look for improvements in the coding scheme, for example, by paying more attention to the nature of an inner code.

Response: To improve the coding scheme is the objective of any digital communication system using error control codes to minimize the errors of transmission, it is no exception for Kibayahi's concatenated system stated in column 1 lines 14-22, lines 25-30, lines 38-41, lines 49-51(inner code), column 2 lines 8-55 (inner code). All these show the motivation for the person skilled in the art to look for improvements in the coding scheme.

Argument: Page 7 lines 17-18, Thus, it is not obvious to combine Kobayahi with Darmon.

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Response: To combine Kobayahi with Darmon is for the pseudorandom interleaving. As Kobayahi using the interleaving/permutation, it is obvious to combine Kobayahi with Darmon's pseudorandom interleaving teaching to obtain high quality interleaving.

Argument: Page 7 lines 20-21, Kibayashi fails to anticipate selecting a recursive code as the inner code.

Response: Kibayashi anticipate selecting a recursive code as the inner code as stated in the previous action: FIG. 12A E_{in} , column 12 lines 30-35. In column 12 lines 50-61, the transmitter side has the turbo codes (FIG. 14A, the recursive convolutional code) in the inner code.

Argument: Page 7 line 26-page 8 line 4, In his decoding schemes, Kobayashi suggests using hard decision symbols and 'erasures' as feedback. This is different than using "extrinsic information" as in the turbo decoding schemes of the present invention, and it leads the skilled person further away from using a recursive inner code because a recursive inner code would explicitly point away from a turbo decoding scheme such as in the present invention.

Response: The present invention (the claims) is regarding the coding scheme not the decoding scheme. The limitation (e.g. the "extrinsic information" if is) in the specification does not read in the claim when this limitation is *not recited in the claim* (see MPEP 2111).

Argument: Page 8 lines 9-10, Similarly, Monogioudis fails to disclose the above features.

Response: Monogioudis discloses the soft-in-soft out (SISO) process. (FIG.3, column 5 lines 39-47). As Kobayashi et al. disclosing the quantizer in the channel, at the time the invention was made, it has been obviously to a person of ordinary in the art to have the SISO

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equalization process taught by Monogioudis et al. in Kobayashi et al.'s decoding process to recover a direct sequence signal effectively to remove the ISI (column 1 lines 45-50, column 5 line 62-column 6 line 2).

The rejections are upheld as in the following:

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3-4, 10, 12, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US Patent 6029264) in view of Darmon et al. (US 5056105).

Regarding **claims 1 & 10**, except explicitly specify the pseudorandom interleaving/permutation Kobayashi et al. discloses a transmitter and its method. It comprised; a) an encoder for encoding the digital information with an outer code (OUTER ENCODER FIG.4/E₁ FIG.12A), b) an interleaver for interleaving the encoded digital information (INTERLEAVER FIG.4/ π_{12} FIG.12A) c) a recursive inner encoder and a memoryless modulator unit for encoding the interleaved encoded digital information with a recursive inner code (INNER ENCODEER FIG.4/E_{in} FIG.12A, column 12 line30-35 where the E₂ is the convolutional/recursive inner code) and in conjunction therewith memoryless modulating (column 3 lines 5-25, where the modulator with constraints is the memoryless modulating, such as the QDPSK) the encoded interleaved encoded digital information; and d) transmitting the modulated information (CHANNEL FIG.2).

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However Darmon et al. teaches the pseudorandom interleaving. At the time the invention was made, it has been obviously to a person of ordinary in the art to have the pseudorandom interleaving taught by Darmon et al. in Kobayashi et al.'s permutation to obtain high quality interleaving (column 2 lines 35-40).

Regarding **claim 3**, Kobayashi et al. teaches the differential code for the inner code (column 3 lines 5-10, where the modulating the coded data with differential inner code).

Regarding **claim 4**, Kobayashi et al. teaches the differential modulation method (column 3 lines 5-15, where the QDPSK is the differential phase shift keying modulation).

Regarding **claim 12**, Kobayashi et al. teaches the inner encoder and modulator unit forms an integrated structure (column 25-26, where the error control code may be concatenated with digital modulation).

Regarding **claim 13**, Kobayashi et al. teaches the integrated structure is a differential modulator (column 5-11, where the QDPSK is the differential modulator).

Regarding **claim 14**, Kobayashi et al. teaches the integrated structure is a Trellis Coded Modulator (column 3 lines 25-40).

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US Patent 6029264) in view of Darmon et al. (US 5056105) as applied to claim 4 above, and further in view of Sturza et al. (US 6157642).

Regarding **claims 5 & 6**, further Sturza et al. teaches a convolutional outer code (column 8 lines 62-67). As Kobayashi et al. providing the inner/outer code and encode combination (FIG.11A, FIG.11B, FIG.12A, column 12 lines 12-45), at the time the invention was made, it has

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been obviously to a person of ordinary in the art to have the convolutional outer code taught by Sturza et al. in Kobayashi et al.'s $E_{out} (E_1, E_2)$ as the outer code to be adaptive to the link requirements to get the error free data (column 8 lines 62-67).

6. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US Patent 6029264) in view of Darmon et al. (US 5056105) and Monogioudis et al. (US 5550810).

Regarding **claim 7**, except explicitly specify (1) the pseudorandom interleaving/permutation and (2) the Soft In Soft Out (SISO), Kobayashi et al. discloses all subject matter claimed: the steps a) to d) (refer to the rationale of claim 1); e) receiving the transmitted carrier (FIG.2 RECEIVER/FIG.12B), f) producing an estimate of the characteristics of the transmission channel (FIG.6A), g) converting the received carrier into consecutive symbols in the FIG.6A ERASURE CHANNEL process using the produced estimate of the characteristics of the channel, h) deinterleaving the symbols (π_{12}^{-1} FIG.12B), and i) decoding the deinterleaved consecutive symbols in a SISO decoding process (D_1 FIG.12B).

With respect to item (1), Darmon et al. teaches the pseudorandom interleaving. At the time the invention was made, it has been obviously to a person of ordinary in the art to have the pseudorandom interleaving taught by Darmon et al. in Kobayashi et al.'s permutation to obtain high quality interleaving (column 3 lines 35-40).

With respect to item (2), Monogioudis et al. teaches the SISO equalization process (FIG.3, column 5 lines 39-47). As Kobayashi et al. disclosing the quantizer in the erasure channel, at the time the invention was made, it has been obviously to a person of ordinary in the art to

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have the SISO equalization process taught by Monogioudis et al. in Kobayashi et al.'s decoding process to recover a direct sequence signal effectively to remove the ISI (column 1 lines 45-50, column 5 line 62-column 6 line 2).

Regarding **claim 8**, Kobayashi et al. discloses a number of iteration through steps g) equalizaion process (ERASURE/ERROR CORRECTOR FIG.8, FIG.11C), h) deinterleaving (DEINTERLEAVER FIG.8, π_{23}^{-1} FIG.11C) and i) decoding (DECODER FIG.8, D_{out} FIG.11C); and step of reinterleaving between steps i) and g) (INTERLEAVER FIG.8, π_{23} FIG.11C) wherein the number is at least 2 (column 7 lines 45-column 11 illustrates the example of iteration, where the iteration is at least 2 with errors in).

Regarding **claim 9**, Kobayashi et al. discloses the step g) working over the combined Trellis of the recursive inner code and modulation of step c) and the interference characteristics of the transmission channel (column 3 lines 25-40 where the TCM, the combined Trellis as the recursive inner code), and the ISI of the channel (column 2 lines 17-22).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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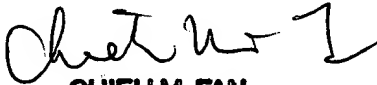
CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 703-305-3416. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
May 12, 2004


CHIEH M. FAN
PRIMARY EXAMINER